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ABSTRACT

School science textbooks and reference books used in New Zealand were examined to investigate the types and number of roles assigned to males and females and the place of men and women in the world as implied in science textbooks. Data recorded included the number of different types of roles and activities assigned to each sex, number of times each sex was shown in illustrations, number of references to famous males and females, number of references to male or female characters, and any incidence of sexism in language used. The overall orientation in science textbooks was in favor of males. Some of the roles shown for females were in fields which were traditionally assigned to males (physics professor, naturalist explorer), but males did not appear in fields traditionally assigned to females. Some books exhibited equal treatment of the sexes, showing science as being for both males and females, but others were still strongly oriented in favor of science as a male occupation. (PB)

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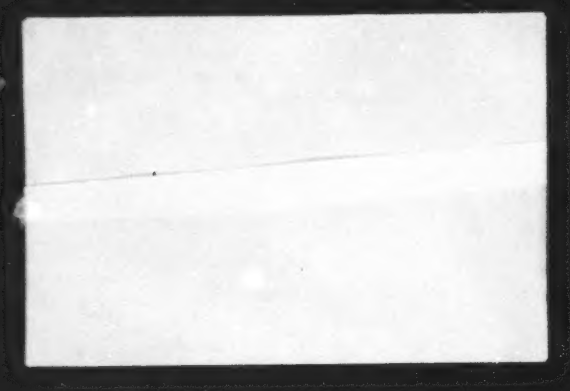

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SEX-ROLE STEREOTYPING

IN SCIENCE TEXTBOOKS

MAY 1980

SEX-ROLE STEREOTYPING IN SCIENCE TEXT-BOOKS

1 Introduction

It was decided to examine school science textbooks as part of a continuing investigation into the incidence of sex-role stereotyping in school textbooks used in New Zealand. This study aims to investigate the types and number of roles assigned to each sex and the place of men and women in the world as implied in science textbooks.

2 Methodology

The science newsletter, Inquiry, No 5, 1979, produced by the Curriculum Development Division, Department of Education, contained a list of the science reference and text books commonly used in New Zealand schools. The list was used as a basis for selecting the books to be studied. They were divided into four groups for this study - reference books, primary school series, secondary school series and books for teachers (primary).

Thirty-five school reference books were examined - all 12 books listed in the newsletter as "Basic Reference Books", all ten Science School Bulletins, four books listed under "Plants", six books listed under "Animals" and three books listed under "Physical Science" reference books. The latter three groups included all the books available at the time the study was carried out.

The other books included in the study, 36 primary, four secondary and five teacher books, were chosen, after consultation with the Department's Development Division and the Wellington Science Adviser, as representing those most commonly used in schools.

All textbooks were examined and the following data recorded: The number of different types of roles and activities assigned to each sex; the number of times each sex was shown in illustrations; the number of references to famous males and females; the number of references to male or female characters; and any incidence of sexism in the language used.

It was also decided to compare Science for the Seventies, Book One, first published in 1970, with a new edition, by the same author, Science for the Eighties, Book One, published in 1979, to see if there were any changes between the two books in the proportions of males and females for each analyses made except the language analysis in which proportions were not used.

Roles and activities assigned to neutral characters such as "the student" or "the teacher" were referred to as neutral roles or neutral activities in this report.

The data recorded for each book were checked by a second person to ensure consistency and accuracy.

3 Results

3.1 Occupations and Roles:

Table 1a: Number of different occupations and roles assigned to male, female and neutral characters.

	Primary Textbooks		Secondary Textbooks		Teachers' Books		Reference Books		Total [2]	
	Number	%	Number	%	Number	%	Number	%	Number	%
Male	94	85	53	85	21	87	144	84	257	87
Female	17	15	9	15	3	13	27	16	40	13
Male and Female	111	100	62	100	24	100	171	100	297	100
Neutral [1]	32		49		10		95		158	

NOTE: 1 Neutral occupations and roles were not included in the percentages when examining the number of roles assigned to males and females.

2 These figures represent the overall number of different roles. If a role has been mentioned in more than one type of book it has been counted only once.

In all types of text and reference books, a greater number of different occupations and roles were assigned to males than females. Six times as many roles were assigned to males as to females overall. The ratio in reference books and primary textbooks was 5:1, in secondary textbooks the ratio was 6:1 and in teachers' books the ratio was 7:1.

Roles assigned to males included those traditionally assigned to males such as astronaut, carpenter, engineer, farmer and philosopher; family roles such as father and son; roles with male suffixes such as headmaster, lumberman and postman; service roles such as teacher and doctor; and roles such as artist, poet, scientist and writer which were once roles traditionally assigned to males but are now filled by both sexes.

Roles assigned to females included those traditionally assigned to females such as typist; family roles such as mother and daughter; service roles such as medical practitioners, teachers and nurses; roles with female prefixes and suffixes such as maidservant, milkmaid and match girl; and roles which were once traditionally assigned to males but are now filled by both sexes such as artist, scientist and author. Two roles still more commonly assigned to males were assigned to females. They were a Professor of physics and a naturalist explorer.

Roles and occupations assigned to neutral characters included most of those assigned to males only, but none of those assigned to females only.

Table 1b: Number of different occupations and roles assigned to male, female and neutral characters in Science for the Seventies, Book One and Science for the Eighties, Book One.

	Science for the Seventies		Science for the Eighties	
	Number	%	Number	%
Male	16	84	13	87
Female	3	16	2	13
Male & Female	19	100	15	100
Neutral	13		22	

NOTE: Neutral figures were not included in the percentages when examining number of roles assigned to males and females.

The ratio of male to female roles showed some change between the two textbooks from just over 5:1 in Science for the Seventies to more than 6:1 in Science for the Eighties. In both textbooks occupations such as coalminer, plumber, doctor, scientist and baker were assigned to males while none of the occupations traditionally associated with females were assigned to males. Females appeared as a typist, mother and sunmaid in Science for the Seventies and to an author and a mother in Science for the Eighties.

This analysis has shown that females were depicted in roles and occupations traditionally associated with males, but males are rarely seen in roles traditionally associated with females.

3.2 Activities:

Table 2a: Number of different activities assigned to male, female and neutral characters.

	Primary Textbooks		Secondary Textbooks		Teachers' Books		Reference Books		Total number of different activities	
	Number	%	Number	%	Number	%	Number	%	Number	%
Male	145	64	85	90	28	67	63	80	300	72
Female	83	36	9	10	14	33	16	20	116	28
Male &	228	100	94	100	42	100	79	100	416	100
Neutral	384		106		60		54		583	

NOTE: Neutral figures were not included in the percentages when comparing males and females.

The ratio of the number of activities performed by males to those performed by females is 2:1 for primary textbooks and teachers' books, 4:1 for reference books and 9:1 for secondary textbooks.

The types of activities assigned to males included scientific activities such as discovering elements, medicines, and the composition of materials; making or fixing things such as building a bomb and fixing a car; and pursuing outdoor activities such as hunting, playing golf, riding a horse and digging. There were also references to males dancing, making hokey pokey and raising flowers. Activities assigned to females included household tasks such as cooking, vacuum cleaning and caring for baby; scientific work such as doing experiments and observing nature; making things such as making a clock and making bread; and pursuing outdoor activities such as doing PE, fishing and walking in a National Park.

There were also references to females bumping other players off a roller derby track, studying medicine and founding the Institute of Radium in Paris.

The neutral activities covered a wide range of activities scientific, constructive, and outdoor.

It can be seen from Table 2a that activities were assigned to males more often than to females. Both males and females performed scientific, constructive and outdoor activities. The types of scientific activities performed by each sex were usually similar although they were assigned to males more often than to females while the types of constructive and outdoor activities performed by males and females were often different. Household activities were also mentioned and the activities performed by each sex were different. These were the only types of activities which were assigned more often to females than to males.[2]

Table 2b: Number of different activities assigned to male, female and neutral characters in Science for the Seventies, Book One, and Science for the Eighties, Book One.

	Science for the Seventies		Science for the Eighties	
	Number	%	Number	%
Male	19	100	24	92
Female	0	0	2	8
Male & Female	19	100	26	100
Neutral	20		44	

NOTE: See note under Table 2a.

Table 2b shows that there had been very little change between Science for the Seventies and Science for the Eighties. The two activities assigned to females in the latter book were washing dishes and dancing. In both books males were assigned a variety of activities none of which were traditionally associated with females.

3.3 Illustrations:

Table 3a: Numbers of males and females shown in illustrations.

	Primary Textbooks		Secondary Textbooks		Teachers' Books		Reference Books		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Male	829	68	557	87	198	67	146	76	1730	73
Female	399	32	83	13	98	33	46	24	626	27
Total	1228	100	640	100	296	100	192	100	2356	100

As shown in Table 3a the science books examined were not well balanced with respect to the numbers of each sex shown in the illustrations.

In all groups of textbooks illustrations of males outnumbered illustrations of females. Primary and teacher textbooks showed a ratio of approximately 2 males to 1 female while reference books showed a ratio of 3:1 and secondary textbooks a ratio of 7:1.

Usually both males and females were active in the illustrations although on the few occasions when one was active and one passive the illustration showed the male active and the female passive. An example was when Mac (driving) and Fennella were travelling along and broke down; Mac fixed the car while Fennella sat inside. Also in a levering experiment the females sat on the table while the male levered it off the ground.

Table 3b: Number of males and females shown in illustrations in Science for the Seventies, Book One, and Science for the Eighties, Book One.

	Science for the Seventies		Science for the Eighties	
	Number	%	Number	%
Males	99	80	162	82
Females	25	20	35	18
Total	124	100	197	100

It is clear from the above table that there was little change between the publications in the large under-representation of females in the illustrations.

3.4 Famous People:

Table 4a: Number of male, female and neutral people mentioned.

	Primary Textbooks		Secondary Textbooks		Teachers' Books		Reference Books		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Male	155	95	62	97	15	88	180	95	412	95
Female	9	5	2	3	2	12	9	5	22	5
Male & Female	164	100	64	100	17	100	189	100	434	100
Neutral	13		24		1		60		98	

NOTE: Neutral figures include famous people mentioned where no clue is given to their sex.

Reference to famous people in total ran heavily (about 19:1) in favour of males. Although people referred to by initial(s) were classed as neutral a more accurate count would probably have included these people as males, for when a female was mentioned her first name was usually used.

Famous males referred to in the books examined came from a variety of walks of life, including the scientific disciplines, the armed forces and royalty. Famous females on the other hand were confined to a nun, titled women, and scientists.

Famous males mentioned in the books examined had glaciers, walking tracks, scales and measures and diseases named after them while only a sound (Queen Charlotte) and a rose mentioned in the books were named after famous females.

Table 4b: Famous males, females and neutral characters mentioned in Science for the Seventies, Book One and Science for the Eighties, Book One.

	Science for the Seventies		Science for the Eighties	
	Number	%	Number	%
Male	3	100	15	88
Female	0	0	2	12
Male & Female	3	100	17	100

Table 4b shows that there had been little change between the two textbooks in the relative numbers of famous males and females described. There are two females mentioned in Science for the Eighties, Mrs Aneas Gunn, an author, and Alice from Alice in Wonderland. The famous male characters ranged widely from ship's captain to scientist and Mad Hatter to philosopher.

3.5 Characters:

Table 5a: Numbers of male and female characters mentioned by first/Christian name in examples in the books examined.

	Primary Textbooks		Secondary Textbooks		Teachers' Books		Reference Books		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Male	85	63	10	63	6	67	8	57	109	62
Female	51	37	6	37	3	33	6	47	66	38
Total	136	100	16	100	9	100	14	100	175	100

The ratios of male characters to female characters ranged from just over 1:1 in the reference books to 2:1 in the teachers' books. When first/Christian names were used in examples there was usually a fairly even distribution of male and female characters.

Three male characters and one female character were mentioned by first/Christian name in Science for the Seventies, Book One; there were no references to characters by first/Christian names in Science for the Eighties, Book One.

3.6 Language:

Many examples of language of a sexist nature were found in the science textbooks examined.

A number of authors refrained from using any pronouns to label non-sexed items but most used the male pronouns 'he,' 'him,' and 'his' when referring to a person, child, foetus and the Sun. The female pronoun 'her' was used on only one occasion to label non-sexed items, and that was for the country of New Zealand. Two books in The Natural World series used 'he or she' on the few occasions when a personal pronoun was needed and 'he or she' was also used once in 'Using the Environment and twice in New Zealand Gemstones but in the latter two books 'he' and 'himself' were used on other occasions.

An orientation towards maleness also occurred in prefixes, suffixes and the generic use of the term 'man'. Examples included everyday terms such as man-made, sportsman, policeman. The names of flora and fauna referred to in the books were more often male orientated than female orientated: Water boatmen, devil's coachman and Chinaman's hat, for example, compared with ladybird and Lady

From the above it can be seen that there were more examples where names of flora and fauna referred to males than to females.

3.7 Quotations Taken From the Textbooks Examined:

Finally, the following quotations, selected at random, reflected the authors' depictions of sex differences in society.

Primary Textbooks:

'If you (female teacher) are bothered about handling them (small creatures), don't worry because there will be at least one boy in the class who will take charge.'

Secondary Textbooks:

'A marked separation between the sexes also occurs in late childhood; boys preferring rough-and-tumble play while girls pursue more feminine activities.'

Teachers' Books:

Using model aircraft example. 'Some girls respond well to work of this nature but many have little enthusiasm for such boys' stuff. They might enjoy activities with a more feminine appeal. Could they, for example, construct a dolls' house . . .'

' . . . many boys develop an interest in more sophisticated engineering toys . . . the girls join in when they are allowed.'

Reference Books:

' . . . girls are just as fond of playing explorers, if their brothers will let them.'

4 Conclusion

The overall orientation in Science textbooks was in favour of males. Some of the roles shown for females were in fields which were traditionally assigned to males, but males did not appear in fields which were traditionally assigned to females.

There were a number of books which stood out for either their equal treatment of the sexes or their strong orientation in favour of males. The former category included those in the two Silver Burdett series and those in the Science Happenings series which all showed science as being for both males and females. The books which were most strongly orientated in favour of males were the Science of the Seventies series and Science for the Eighties, Book One. None of the books studied was orientated in favour of females.

Research and Statistics Division
Department of Education
Wellington

May 1980

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